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Coral-inhabiting Crabs of the Family Hapalocarcinidae from Japan

III. New Genus *Fizesereneia*

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Troglocarcinus heimi and *T. stimpsoni* described by FIZE & SERÈNE (1955 a, b) are peculiar in having the deeply excavated anterior half of the carapace. Several specimens from the Ryukyu Islands were identified with *T. heimi* and a new species close to it. After careful consideration of their relationship to the representatives of *Troglocarcinus* and the related genera, we came to a conclusion that the three species in question are not congeneric with the type-species of *Troglocarcinus*, *T. corallicola* VERRILL from the Bermudas, Straits of Florida and West Indies. Thus, in the following lines a new genus is established to accomodate the three Indo-West Pacific species.

Before going further we must express our cordial thanks to Dr. Robert H. GORE of the Smithsonian Institution, Ft. Pierce Bureau, who kindly provided us with the elaborate sketches of *T. corallicola*. The junior author's cordial thanks are due to Dr. Ryôsuke ISHIKAWA of Tokyo Metropolitan University for giving him the opportunity to make this study. The new species described in this paper is dedicated to and named after him.

Fizesereneia gen. nov.

Troglocarcinus (Mussicola) FIZE & SERÈNE, 1957, p. 110 (in part).

Troglocarcinus: SERÈNE, 1966, p. 396 (in part).

Diagnosis. Carapace moderately depressed dorso-ventrally and longer than broad, with lareral borders converging posteriorly. Anterior half of dorsum completely or incompletely divided into two large concave, smooth parts side by side by a median longitudinal ridge. Front rather developed and fringed with several spinules.

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Chelipeds slender in both sexes. Abdominal appendages of female with three pairs; the first biramous with a rudimentary exopod, and the second and third uniramous.

Type-species. *Troglocarcinus heimi* FIZE et SERÈNE, 1955.

Remarks. The genus *Troglocarcinus* erected by VERRILL (1908) to accomodate *T. corallicola* VERRILL from the Bermudas was considered as a synonym of *Cryptochirus* HELLER by EDMONDSON (1933). This was followed by RATHBUN (1937). UTINOMI (1944) examined the specimens of "*Troglocarcinus*" *corallicola* and transferred this species together with the type-species *Ps. viridis* HIRO and "*Cryptochirus*" *crescentus* EDMONDSON to *Pseudocryptochirus* HIRO erected by himself in 1938. This was due to the broad and depressed carapace and the presence of a rudimentary exopod on the first abdominal appendage of female. In other words, he considered *Troglocarcinus* as a synonym of *Pseudocryptochirus*. Then, as pointed by MONOD (1956), the use of the generic name of *Pseudocryptochirus* was unreasonable inspite of his extensive discussion. Subsequently FIZE & SERÈNE (1955 a, b) resurrected *Troglocarcinus* and described many additional species from Viet-Nam. Two years later they subdivided *Troglocarcinus* into four subgenera, viz., *Troglocarcinus* s. str., *Favicola*, *Mussicola* and *Fungicola*. This may be reasonable, but wrong in its nomenclatural procedure. Firstly, the first subgenus *Troglocarcinus* s. str. was based on *T. viridis* (Hiro), and secondly the type-species of *Troglocarcinus*, *T. corallicola* VERRILL, was referred to the subgenus *Mussicola* in which additional two species, *T. heimi* FIZE et SERÈNE and *T. stimpsoni* FIZE et SERÈNE, were also included. According to the emendation of SERÈNE (1966), the subgenus *Troglocarcinus* represents the genus *Pseudocryptochirus*, the subgenus *Mussicola* is reduced to a synonym of the genus *Troglocarcinus*, and the subgenera *Favicola* and *Fungicola* are elevated to the generic level.

The new genus erected at present is apparently equivalent to the subgenus *Mussicola*, but as rightly considered by SERÈNE (1966), *Troglocarcinus* (*Mussicola*) including *T. corallicola* must be suppressed. Thus a new genus is erected to accomodate three species from the West Pacific, *T. heimi*, *T. stimpsoni* and a new species described in this paper. As a result, the genus *Troglocarcinus* VERRILL is monotypically represented by *T. corallicola* VERRILL from the Bermudas, Straits of Florida and West Indies, which differs from the three West Pacific species by having two indistinct, granulated concavities both sides of the median line. The most surprising difference is the nature of these concavities, and thus the general appearance of the carapace of *Troglocarcinus* is rather closer to some species of *Cryptochirus* and *Pseudocryptochirus*. The genus *Cryptochirus* differs from *Troglocarcinus* in having the uniramous first abdominal appendage of female, but it is rather difficult to separate *Troglocarcinus* from *Pseudocryptochirus*, as pointed by SHAW & HOPKINS (1977) who improperly transferred *T. corallicola* to *Pseudocryptochirus*.

***Fizesereneia heimi* (FIZE et SERÈNE, 1955), comb. nov.**

[New Japanese name: Kubomi-sangoyadorigani]

(Figs. 1, 2, 3A-B, 4)

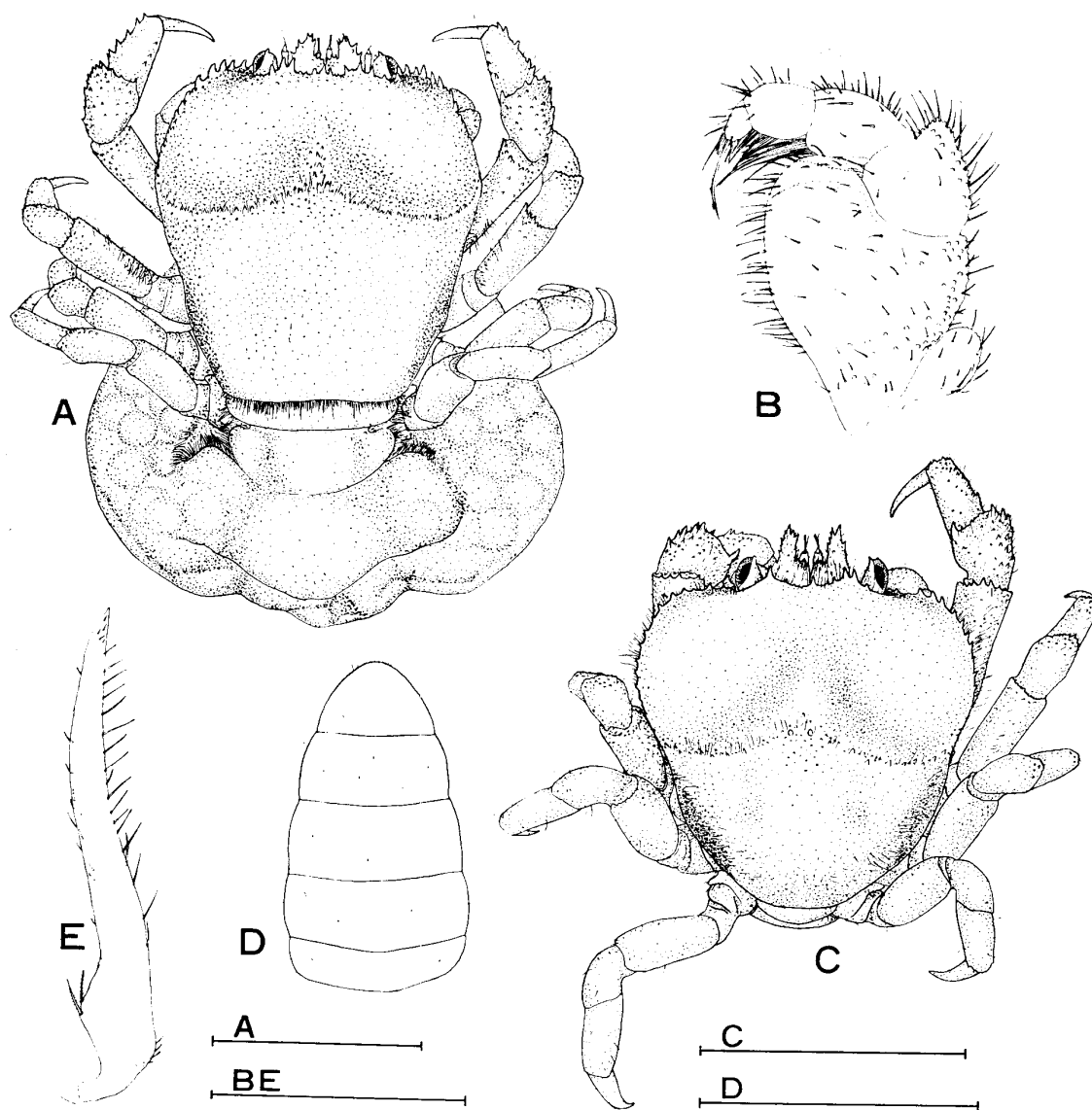


Fig. 1. *Fizesereneia heimi* (FIZE et SERÈNE). — A, B. Ovig. ♀ (NSMT-Cr 6337-1). — C-E. ♂ (NSMT-Cr 6339-2). A, C, entire animals; B, left third maxilliped in abdominal view; D, distal five segments of abdomen; E, left first pleopod in abdominal view. (Scales for A, C=3 mm, B E=1 mm, D=2 mm).

Troglocarcinus heimi FIZE & SERÈNE, 1955a, p. 378, fig. 2 (H); SERÈNE, 1966, pp. 396, 398.

Troglocarcinus (Mussicola) heimi: FIZE & SERÈNE, 1957, p. 111, figs. 29, 30, 31 (A, B), pls. 5 (13), 7 (1, 2), 12 (E-G), 18 (A-D).

Description. Female. Carapace a little longer than broad and roughly hexagonal in its outline, being widest at anterior one-third. Dorsum moderately depressed, and its anterior half wholly divided into two large, concave and smooth regions side by side which are restricted anteriorly and laterally by spinulated frontal, supraorbital

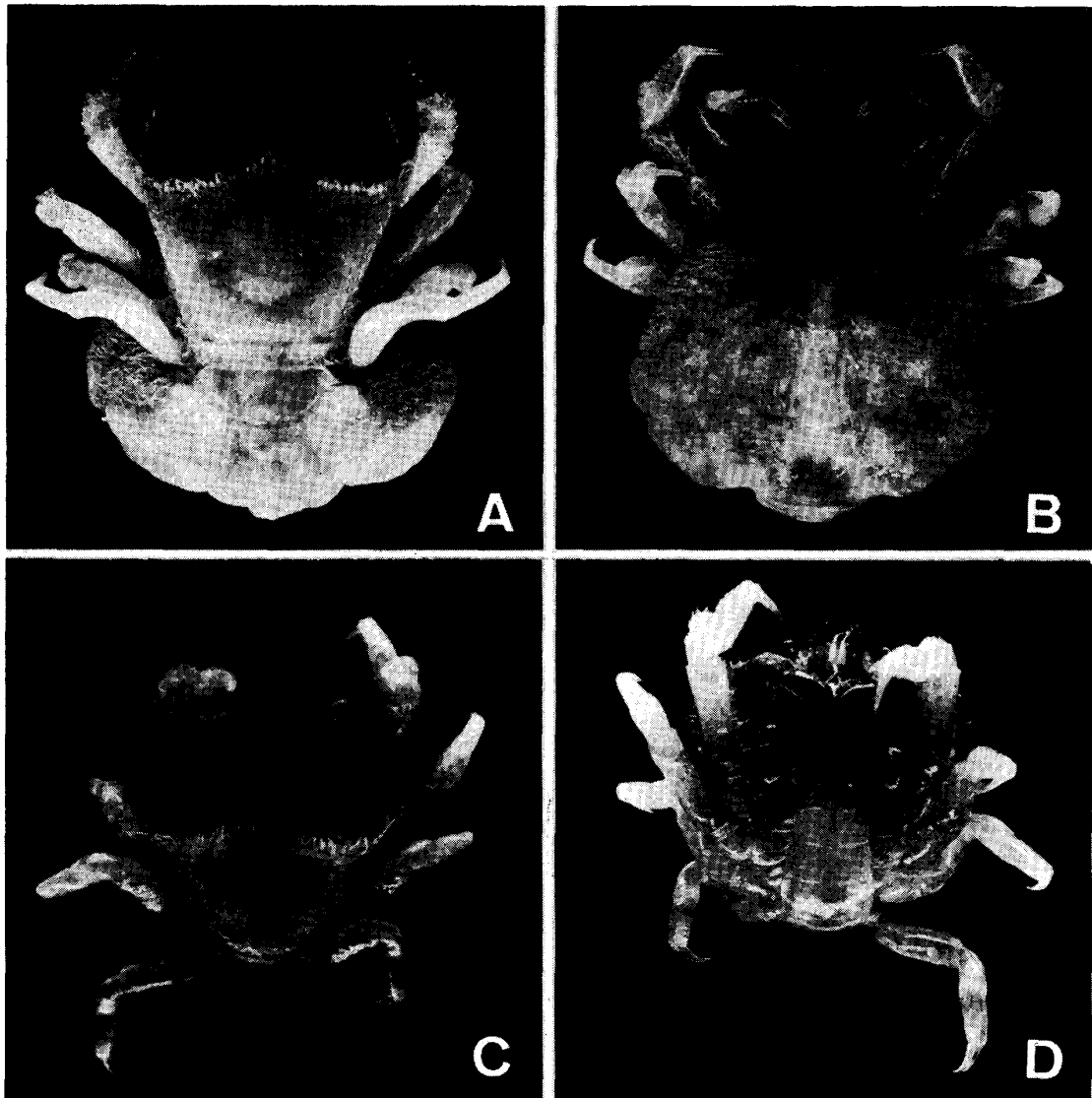


Fig. 2. *Fizesereneia heimi* (FIZE et SERÈNE). — A, B. Ovig. ♀ (NSMT-Cr 6337-1). Breadth and length of carapace, 4.7 and 5.2 mm. — C, D. ♂ (NSMT-Cr 6339-2). Breadth and length of carapace, 3.8 and 4.1 mm.

and carapacial anterolateral borders; posterior borders of both concave regions weakly convex posteriorly, spinulated, hairy and brought together at median part of carapace and extended anteriorly to form a short ridge for septum between both regions; posterior half of dorsum covered with minute granules and sparse short setae. Front moderately concave and fringed with spinules and setae, bearing a low median projection. Supraorbital border shallowly concave; its internal and external angles rather rounded, each with spines; front-orbital border a little shorter than posterior border of carapace, and as long as half of greatest breadth of carapace. Eyestalk almost hidden under carapace in dorsal view. Basal segment of antennule well developed and protruded beyond antenna and eyestalk, being armed with several spinules

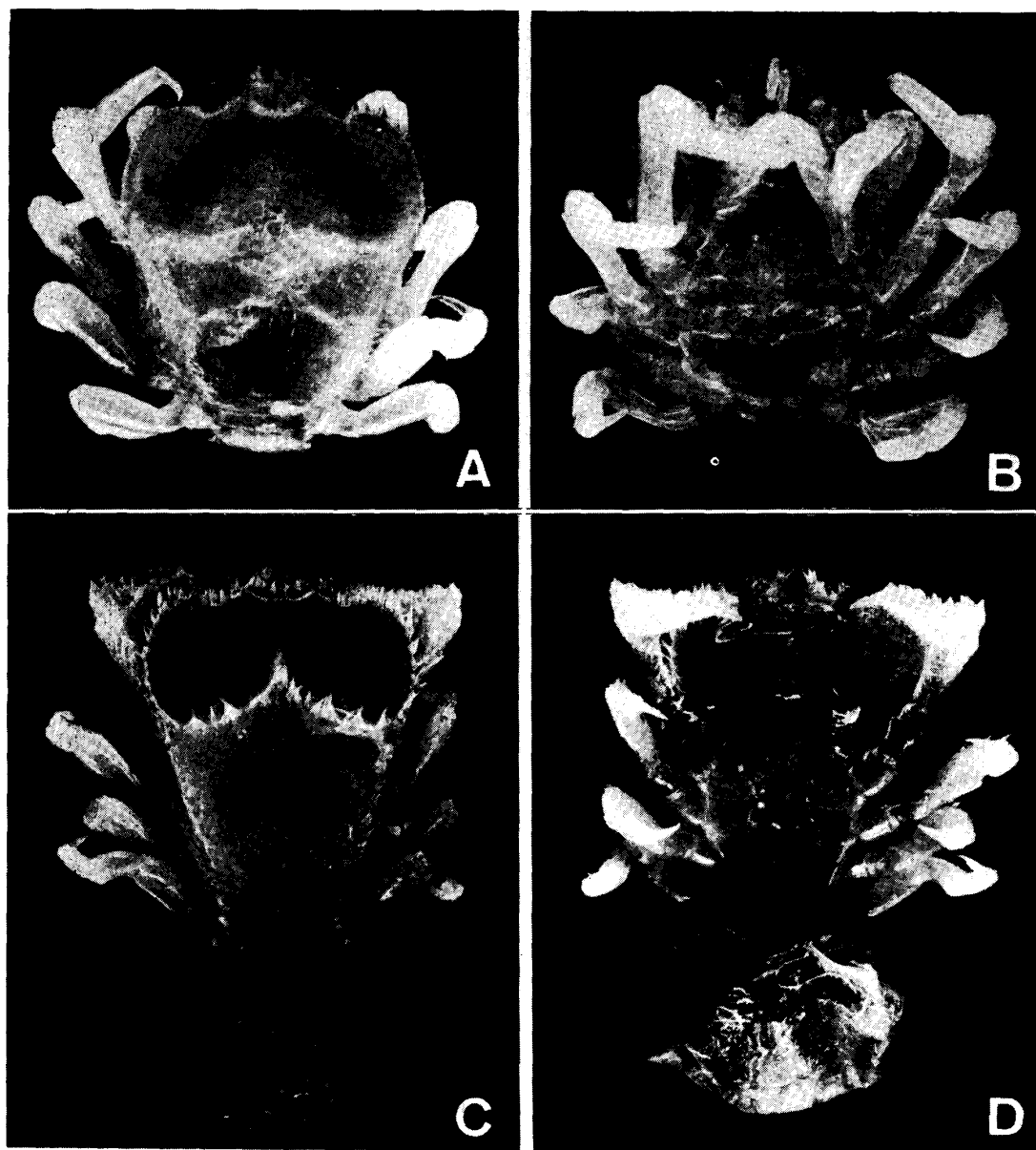


Fig. 3. A, B. *Fizesereneia heimi* (FIZE et SERÈNE), young ♀ (NSMT-Cr 6339-1). Breadth and length of carapace, 3.2 and 3.6 mm. — C, D. *Fizesereneia ishikawai* sp. nov., ♀, holotype (NSMT-Cr 6340). Breadth and length of carapace, 3.9 and 4.4 mm.

along margin. Third maxilliped as figured.

Both chelipeds slender, equal in size and shape, and hidden under carapace for their most parts in natural position; upper border of palm nearly equal to fingers in length and a little shorter than twice its height; fingers entire on cutting edges and leave a short gape proximally, with tips scarcely crossing each other.

First ambulatory leg longer and stouter than cheliped; merus compressed and not longer than twice its height, with outer surface granulated and hairy; upper border

fringed with spiniform granules and longish setae; carpus as long as its height and covered with spinules of various size; propodus also with some spinules. Second ambulatory leg generally resembles the first, but shorter. Third ambulatory leg slenderer and nearly as long as the second, being covered with a few number of granules on merus, carpus and propodus. Fourth ambulatory leg the slenderest and nearly as long as the third.

Male. Smaller than female. Carapace subtriangular, with its lateral border strongly convergent posteriorly; lateral borders continue smoothly to posterior border, so posterolateral angles are not defined at all. Two large concave regions occupy almost, or more than, anterior half of carapace. First pleopod rather slender.

Material examined. Five females and one male were collected at depths of 5 to 15 metres in the Yaeyama Group of the Ryukyu Islands. They are listed in Table 1.

Table 1. Specimens identified with *Fizesereneia heimi* (FIZE et SERÈNE)

Specimen number NSMT-Cr	Sex	Measurment of crab in mm		Measurement of pit in mm			Host coral	Locality
		Breadth of carapace	Length of carapace	Major axis of entrance	Minor axis of entrance	Depth of pit		
6336	ovig. ♀	4.6	5.1	6.3	4.3	10.0	<i>Lobophyllia costata</i>	Kuro-shima
6337-1	ovig. ♀	4.7	5.2	—	—	—	"	Kohama- jima
6337-2	ovig. ♀	4.5	5.0	7.5	4.7	9.0	"	"
6338	♀	3.4	3.9	5.0	3.4	8.8	"	Kayama- jima
6339-1	♀	3.2	3.6	—	—	—	<i>Symphyllia recta</i>	"
6339-2	♂	3.8	4.1	5.8	3.3	12.5	"	"

In this table the specimens with same stem number were obtained from one coral block.
Date of collection. NSMT-Cr. 6336—Apr. 22, 1979; other specimens—Apr. 23, 1979.

Host. The host corals recorded by the original authors are *Lobophyllia hemprichii* (EHRENBERG), *L. corymbosa* (FORSKÅL), *Symphyllia nobilis* (DANA), *S. labyrinthica* BASSET SMITH and *S. agaricia* M. EDWARDS et HAIME. As recorded in Table 1, the specimens dealt with at present were obtained from *L. costata* (DANA) [Jap. name: Hanagata-sango] and *S. recta* (DANA) [Jap. name: Toge-dainô-sango].

As also known from Table 1, the pits are rather shallow and twice to thrice the carapace length. Considering the total length of the female with the elongated and expanded abdomen it is readily understood that in each case the pit is occupied by the crab along its whole length. Major diameter of entrance is reasonably wider than the carapace breadth. The crab closes the opening of the pit just like an operculum by the concave regions of the anterior half of the carapace. The marginal spinules and hairs of the concave regions are well adapted to the harsh appearance of the host

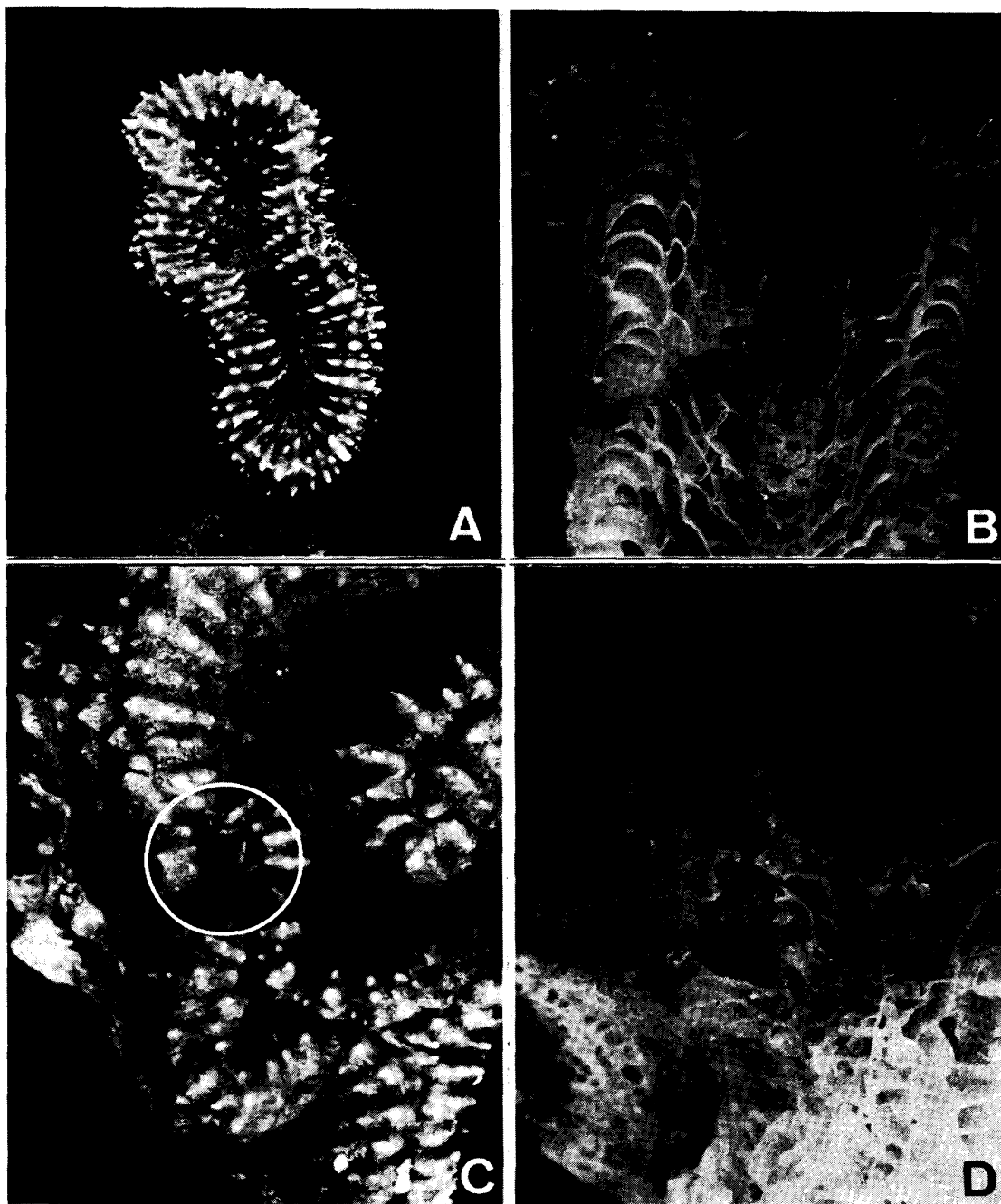


Fig. 4. *Fizesereneia heimi* (FIZE et SERÈNE). — A, B. Ovig. ♀ (NSMT-Cr 6336) staying in pit on *Lobophyllia costata* (DANA). — C, D. ♂ (NSMT-Cr 6339-2), staying in pit on *Symphyllia recta* (DANA).

coral.

Color. As figured by FIZE & SERÈNE (1957), the coloration may vary individually. In the specimens at hand the concave anterior half of the carapace is dark green, with blackish spots; behind each concavity is a wide whitish grey region which is extended

posterolaterally; the posterior median part of the carapace, the abdomen and the ambulatory legs are light brown with small whitish irregular speckles. This coloration is rather similar to one of the figures given by the above authors.

Distribution. Hitherto known only from Nhatrang, Viet-Nam (FIZE & SERÈNE, 1955 a, 1957) and the Moluccas, Indonesia (SERÈNE *et al.*, 1974).

***Fizesereneia ishikawai* sp. nov.**

[New Japanese name: Kubomi-sangoyadorigani-modoki]

(Figs. 3 C-D, 5)

Description of holotype. Carapace moderately depressed, subquadrangular and longer than broad (length and breadth, 4.4 and 3.9 mm, respectively). Anterior part of dorsum deeply concave and smooth, being imperfectly subdivided into two by a Λ -shaped short, median septum originating from posterior margin of concavity; posterior margin of each side of concavity convex posteriorly, being fringed with a few spinules and dense soft hairs; this septum may represent anterior part of gastric region. Posterior part of dorsum flattened with faint indication of regions and covered with sparse setae and minute granules along lateral and posterior borders, lateral borders being weakly ridged; branchial region separated from gastric and cardio-intestinal regions by a wide, shallow depression; posterior part of gastric region becoming narrower and followed by anterior part of cardio-intestinal region.

Front shallowly concave and fringed with spinules and setae. Internal and external orbital angles each with a larger spine; supraorbital border also shallowly concave, but eyestalk almost hidden under the carapace in dorsal view; distance between external orbital angles of both sides a little shorter than posterior border of carapace. Anterolateral border of carapace or the lateral margin of concavity weakly and regularly convex, thin and rather upturned, being fringed with spinules and hairs.

First segment of antennule longer than antenna and eyestalk, being armed with some spinules on its outer border. Ischium of third maxilliped subtriangular, and a little broader than the length of its outer margin; inner margin of ischium feebly denticulated, with short setae, while outer margin is distinctly denticulated; merus a little narrower than the length of its outer margin, and prominently produced at its outer distal end; inner margin with sparse long setae and outer margin denticulated with short setae; carpus, propodus and dactylus each with a bundle of setae at inner distal end; exopod as long as half the outer margin of ischium.

Both chelipeds slender and equal in size, hidden under the carapace for their most parts in natural position; merus as long as twice its height, being covered with sparse setae; carpus a little shorter than twice its height and covered with small granules at its upper surface; upper border of palm nearly as long as movable finger and longer than its height; fingers entire on cutting edges and meet along their almost whole lengths; tips of fingers crossing each other.

First ambulatory leg longer and stouter than chelipeds; merus compressed and

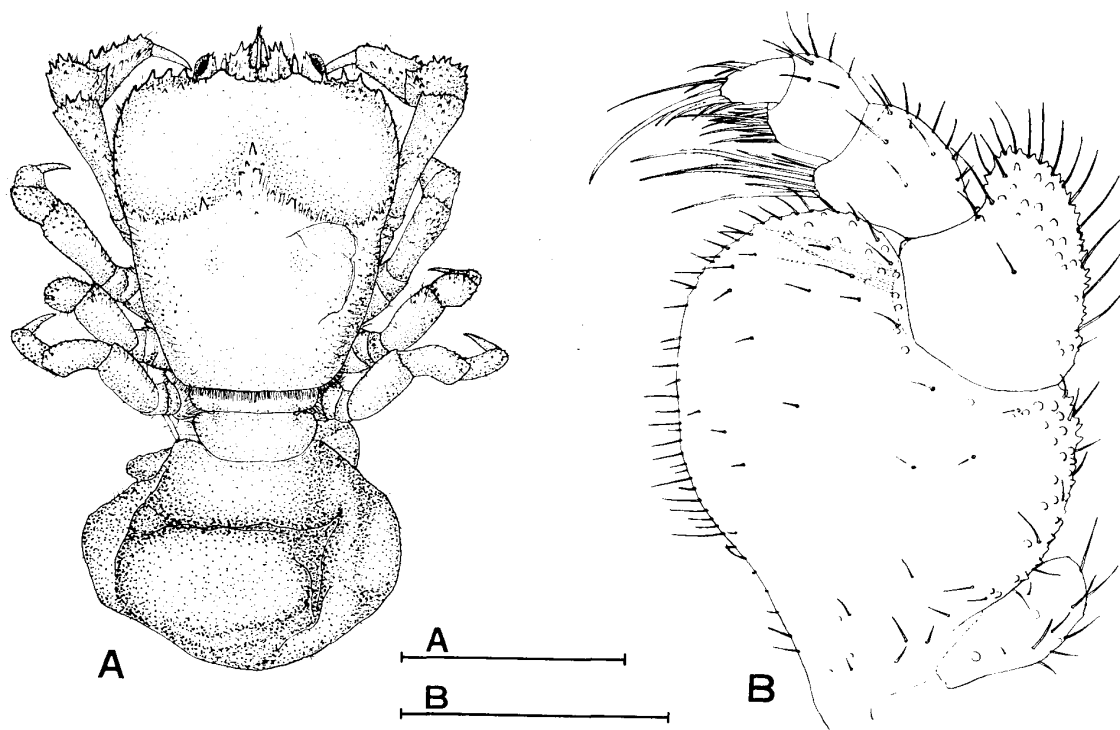


Fig. 5. *Fizesereneia ishikawai* sp. nov., ♀, holotype (NSMT-Cr 6340). — A, entire animal; B, left third maxilliped in abdominal view. (Scale for A=3 mm, B=0.5 mm).

shorter than twice its height, being entirely covered with setae which are a little longer at upper and lower surfaces; upper border of merus with sparse granules which are more distinctly spiniform anteriorly; anterior distal margin of merus armed with spines and granules; upper border of carpus longer than its height and covered with spines and granules; propodus also bearing spines. Second ambulatory leg generally resembles the first, but shorter. Third ambulatory leg nearly as long as the second; merus, carpus and propodus bearing a few numbers of granules. Fourth ambulatory leg nearly as long as the third, but more sparsely granulated. A small lobe on upper surface of each coxa from second to fourth ambulatory legs.

Material examined. One female, holotype, NSMT-Cr 6340; Arakawa, Ishigakijima I., Yaeyama Group, Ryukyu Is., ca. 5 m deep; Apr. 24, 1979.

Host. The holotype female was obtained from *Symphyllia* sp. The fine morphological adaptation to the host coral is the very same as the case of *F. heimi*.

Remarks. The new species is really close to *F. heimi* in general formation of the carapace, chelipeds and ambulatory legs, but most remarkably different from it in the contour of the carapace. In *F. heimi* the carapace is roughly hexagonal and the widest at the posterior ends of the concavities of both sides, while the carapace of the new species is nearly subquadrangular and regularly narrowing posteriorly. In other words, the shape of the concavities are different from each other in the two species. In addition, in the new species the concavities are much deeper, more strongly convex

posteriorly and more imperfectly subdivided into two. There is no trace of ridge in front of the posterior Λ -shaped septum in the new species, while the blunt septum runs anteriorly, though not reached to the frontal border.

In *F. stimpsoni* the carapace is rather narrow somewhat like in the new species, but the concavities are shallower and completely divided into two by a median distinct ridge.

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